Feline hyperthyroidism: treatment (all, but I-131)

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ESVE summer school Bologna June 2018
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Treatment /management options include:

Reversible: medical treatment with anti-thyroid medication or nutritional management with an iodine-restricted diet
Irreversible/curative: radio-iodine treatment, surgical thyroidectomy, less common ultrasound-guided heat or ethanol ablation of the thyroid gland.
Ideally, medical or dietary options should be tried and tested before considering the irreversible treatment options. Final decision for treatment should be made together with the owner taking into account among others, the cat's age, tolerance of medications, owner finances and ability to be compliant with medications, presence of concurrent disease, availability and willingness of owner to pursue I131.

Anti-Thyroid drugs

The thioureylene methimazole and its pro-drug carbimazole are the drug of choice for the treatment of feline HT. They inhibit thyroperoxidases in the thyroid follicular cells thereby leading to a reversible decrease in the synthesis of thyroid hormones (T4 and T3).
The recommended starting dose of methimazole is 2.5mg / cat PO twice daily, a sustained-release formulation of carbimazole is available in some European countries and is started at 10 or 15 mg, PO, once daily.

Transdermal medication

If owners are unable to pill the cat or if gastro-intestinal side effects occur, a change to a transdermal methimazole formulation can be tried. Currently there are no registered products and the cream has to be produced by compounding pharmacies. Dosage usually is the same as with the oral product. It is important to instruct the owners to wear gloves to administer the drug to avoid “self-therapy”.

Treatment monitoring

First reassessment is recommended after 2-4 weeks of therapy, depending on the clinical condition of the cat and the presence of concurrent disease (e.g. cardiac failure) and pre-treatment blood parameters (e.g. urea, creatinine). If euthyroidism is not achieved after 4 weeks, dosage adjustments are usually made in 1.25–2.5 mg/day increments. Owner compliance must be assessed before increasing the dose.
Serum T4 concentration should be maintained within the middle of the reference interval. For long-term treatment, it is very important to avoid iatrogenic hypothyroidism (see below). Findings of low serum T4 with high TSH concentrations are diagnostic for iatrogenic hypothyroidism, and therefore the daily dose of methimazole should be decreased.

Adverse effects of medical therapy

Adverse reactions associated with anti-thyroid drugs usually occur within the first 3 months of starting therapy, including nausea, vomiting, lethargy, diarrhea and facial excoriation.
Life-threatening adverse reactions include agranulocytosis, thrombocytopenia and hepatopathy, but only rarely occur. If treatment is stopped, clinical signs are reversible. If leukopenia, eosinophilia, and lymphocytosis are noted, they should be closely monitored, as they usually resolve despite continuing treatment.
Disadvantages of medical therapy are:
Compliance, treatment intolerance, efforts and costs associated with lifelong treatment / monitoring. Another major disadvantage of medical therapy is that the disease tends to advance despite the medication (no cytotoxic effect of methimazole/carbimazole). There is evidence that the prevalence of large thyroid tumors, multifocal disease, intrathoracic thyroid masses and suspected malignant disease increase with disease duration in medically treated cats.

Limited-Iodine / iodine-restricted Diet

Iodine is essential in the production of thyroid hormones and limited nutritional availability of iodine leads to reduced thyroid hormone concentrations. Within 4 to 8 weeks of strictly feeding the commercially available diet (Hill`s prescription diet y/d Feline thyroid health), approximately 90% of HT cats become euthyroid, after 12 weeks almost all cats have T4 concentrations within the reference interval. So far, iatrogenic hypothyroidism could not be shown even after prolonged feeding of the diet. A major disadvantage however is that all other food, treats or table scraps must be strictly avoided, because they will counteract the effects of the diet and re-increase the T4 concentration. This can be problematic in the long-term management of the disease. Also, the composition of y/d (rather low protein and high carbohydrate content) may not be optimal in the long run for cats. But, against earlier concerns, the diet can be used in a muti-cat household, where healthy cats have access to the diet as in a recent study it could be shown that feeding a limited-iodine diet for 2 years to healthy adult cats did not lead to iatrogenic hypothyroidism or goiter.

Surgical thyroidectomy

Depending on the experience of the surgeon, thyroidectomy can be a good treatment option especially if radio-Iodine treatment is not available. The risk of anesthesia in untreated HT cats is high and to decrease peri- and postoperative mortality, cats should be medically treated and stabilized before the surgery.

Surgical complications include post-op laryngeal paralysis/voice change, Horner's syndrome and iatrogenic hypoparathyroidism (hypocalcemia) if bilateral surgery is performed. Calcium levels should be monitored 3–7 days postoperatively and hypocalcemia treated if clinical symptoms occur or if concentrations of ionized Calcium are in the very low range. Recovery of the parathyroid gland function is possible (dependent on the surgical technic) but can take days to months. Temporary or permanent hypothyroidism (bilateral thyroidectomy) is also possible and has to be monitored at regular intervals. Recovery is possible, however if clinical signs of hypothyroidism develop or azotemia worsens, levothyroxine supplementation should be started. Moreover, even after bilateral thyroidectomy recurrence of hyperthyroidism is possible.

Table 1: Comparison of options for managing cats with hyperthyroidism

Treatment option	**Advantage**	**Disadvantage**
Anti-thyroid drugs	Reversible Easily available Initial costs low and spread over time No hospitalization	Not curative Daily administration Compliance difficult Side effects possible
Limited-iodine diet	Reversible Easily available Costs spread over time No hospitalization	Not curative Only single food required Compliance difficult
Thyroidectomy	Curative	Anesthesia and hospitalization required High initial costs Risk of postoperative hypocalcemia and other surgical complications Not effective for ectopic tissue Recurrence possible
Radio-iodine	See lecture Prof. Dr. M Peterson	

Post-treatment renal disease/ insufficiency

Chronic kidney disease (CKD) may be masked during the hyperthyroid state and due to the decrease in the glomerular filtration rate during therapy, overt CKD can develop (independent of the treatment modality). Prevalence of CKD varies between 15 and 60%. Unfortunately, to date, there is no clinical test that can reliably predict which cats have concurrent CKD that will become overt after treatment of the hyperthyroid state.

In a recent study it has been shown that as a diagnostic test for masked CKD in untreated hyperthyroid cats, SDMA has a sensitivity of 33.3% and a specificity of 97.7%. This means that finding a high serum SDMA concentration in a hyperthyroid cat can help to predict the development of azotemia after treatment, however, due to the low sensitivity a normal SDMA concentration cannot excluded it.

Care must be taken to avoid iatrogenic hypothyroidism as it may contribute to the development of azotemia in cats treated for HT and these cats may have a shorter survival time compared to azotemic but euthyroid cats.

The prognosis of hyperthyroid cats if treated adequately, is good.

References:

Available from author upon request.